

Digital Transformation in Tax Administration: Evaluating the Impact of SAP Implementation on Revenue Collection and Tax Evasion at the Tax Centre Oum El Bouaghi (Comparative Study 2014-2023)

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Abstract:

The present study will attempt to analyze the transformative results brought about by the SAP implementation on revenue collection and tax evasion at the Tax Centre Oum El Bouaghi as an illustration of dramatic change that digital transformation has had on tax administration. In this regard, the objectives would be to assess the impact on revenue collected, to assess how effectively the SAP system works in terms of reducing tax evasion, and to compare the performance of SAP with the previous SIREC + SGF system concerning completeness and effectiveness. The results showed that, compared to the amount collected earlier, it nearly doubled after the implementation of SAP, which points to the strength of SAP in data management and process automation. However, the study again notes that amounts not collected noticeably increased, thus showing that while reinforcing certain specific administrative functions, the impact of SAP on reduction of tax evasion is complex, multi-factorial in nature, with

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influence due to both enforcement strategies and compliance behavior of taxpayers. The study underlines the need for continuous adaptation and integration of digital tools in the administration of taxes if developing countries are to gain the full benefits of technology while facing the challenges brought forth in tax evasion.

Keywords: Tax Administration, Digital Transformation, SAP, Revenue, Tax Evasion.

Jel Classification Codes :O3

1. INTRODUCTION

The 21st century brought changes along the line of digitization into different sectors, or more particularly, into public administrations. This change is to enhance efficiency, transparency, and service delivery through the borrowings of information and communication technologies. The transformation concerns not only the changes in the tools and processes used by public institutions but also touches on the very way in which these entities conceive the relations with citizens and other interlocutors. So far, the impact of ICTs has been pervasive, diffusing into the digital economy in all its manifestations as new forms of economic transactions, social relations, and modes of governance. In public administration, it is manifested in e-government, e-public services, data-driven decision-making, and automation of the administrative process. Advanced technologies cloud computing, artificial intelligence, and blockchain push the frontiers of what is possible for public sector management and service delivery. Tax administration remains one of the most strategic areas where digital advances have their full play sophisticated information systems support the collection of revenue and help in combating tax evasion with a view to enhancing compliance and equity in tax systems. This development is manifested in the use of ERP systems, such as SAP, in various tax administrations for expedient processing in real time, with an enhanced ability for analysis and coordination across different departments. However, this also signifies massive transitions that will not go without problems, so effectiveness would need to be carefully assessed.

This study, by focusing on the implementation of SAP at the Tax Centre Oum El Bouaghi in Algeria, aims to understand the broader effects of ICT adoption in public administration. The

research explores how digital transformation influences revenue collection and tax evasion, contributing to the discourse on technology's role in evolving public sector operations and the digital economy. This analysis is crucial for governments as they navigate the complexities of digital transformations, aiming to achieve more efficient, transparent, and responsive governance in the digital age.

Problem Statement: Despite the potential benefits of digital transformation in tax administration, the implementation of new systems does not always yield the expected results. This study aims to evaluate the impact of SAP implementation on revenue collection and tax evasion at the Tax Centre Oum El Bouaghi in Algeria, examining both the successes and challenges encountered in this digital transition.

The question of the study:

The overall questions that the study puts forward are:

- How did the implementation of SAP influence the collection of the revenue at the Tax Centre of Oum El Bouaghi?
- What is the impact that SAP has played so far in identifying and reducing tax evasion?
- How does the performance of SAP compare regarding efficiency and effectiveness to the previous system SIREC + SGF?

Hypothesis:

- The SAP implementation has increased the collection revenue considerably at the Tax Centre Oum El Bouaghi.
- SAP has enhanced the detection capability of losses in tax revenues and reduced the rate of tax evasions compared to the previous system.

- The SAP system performs considerably much better in terms of effectiveness and efficiency as compared to the SIREC + SGF system.
- Measuring the impact of the SAP implementation on the revenue collected in the Tax Centre Oum El Bouaghi.
- Investigating how effectively SAP achieves its objectives in regard to the identification and reduction of tax evasion.
- Testing how the approach compares to the SAP system on efficiency grounds considering the before SIREC + SGF system.

Significance of the Study:

The study will be of meaningful insight into the pragmatic impact brought by a digital transformation in tax administration. From this case study of Tax Centre Oum El Bouaghi, some key conclusions have been developed related to how integrated information systems, like SAP, are able to influence revenue collection and tax evasion. The findings contribute to the knowledge of policymakers and tax administrators about possible benefits and challenges arising from such a system and thus help nurture future digital transformation efforts in the area of tax administration.

Methodology:

The research would be conducted in a descriptive and analyzing manner. It combines quantitative analysis of the revenue collection data and tax evasion before and after the SAP implementation with a qualitative assessment of the system's features and functionalities. Primarily, the comparative analysis is used to attribute the performance of the SAP against the previously used SIREC + SGF system.

2. Literature of the review

An integrated analysis of digital transformation in tax administration makes clear the contribution from digital

technologies towards strengthening taxation processes, governance, and economic inclusion, as well as creating public value. The aim of these studies is to shed light on contemporary initiatives that modernize tax administration using digital tools, with a view toward improving efficacy, compliance, and inclusivity. In particular, (Nazarov, Mikhaleva, & Chernousova, 2020) investigated the real-time potential of advanced digital technologies in tax procedures and identified factors that drive or hinder their efficiency. They concluded that real-time digital technologies can enhance efficiency and precision, allowing tax administration to be more dynamic and responsive. Similarly, (Gorshkova, Ksenda, & Grigorenko, 2022) focused on the role of digital technologies in advancing economic inclusiveness and sustainability by improving tax accessibility and transparency. They found that these technologies simplify tax processes, leading to broader compliance. (Zeleti, Walsh, Ojo, & Mulligan, 2021) analyzed governance capabilities in digital tax transformation, emphasizing structural and decision-making aspects from a leadership perspective. Their research identified effective governance of digital technologies as a key strategic enabler for successful digital transformation. (Burdenko & Bykasova, 2023) conducted a comparative analysis of e-government models in different countries, with a focus on the successful implementation of digital tools to improve tax administration services. Their analysis revealed that countries with advanced digital tax systems, like the USA and South Korea, offer better services and higher taxpayer satisfaction. (Radosavljević, Babin, & Erić, 2023) identified imbalances in Serbia's digital transformation and proposed solutions to enhance its effectiveness while reducing the burden on taxpayers. They highlighted the need for automated solutions, simplified legislation, and empowered staff to meet OECD standards. (Tuttman & MacAdar, 2020) proposed a

conceptual framework for evaluating public value creation through digital transformation, using Brazil's state-level tax administration as a case study. They found that digital transformation enhances transparency, accountability, and efficiency in tax administration. In Russia, (Skachkova, 2021) discussed how automation in tax planning and control helps resolve tax disputes and build public trust by ensuring transparent practices. (Calderón & Ribeiro, 2020) addressed the potential risks to taxpayer rights posed by AI tools in combating tax fraud, advocating for algorithmic accountability to protect taxpayer rights. For the Algerian studies, (Dahmoune & & Karmi, 2024) explored how digital transformation through the Jibaya'tic portal affects taxpayer compliance, noting a positive impact despite service interruptions and missing functionalities like online payment. (Bensabour Slimane, 2024) assessed the role of electronic tax declarations in enhancing tax control effectiveness at Ain Temouchent, revealing significant reductions in formal errors and improved control effectiveness. (Arab & Mostefaoui, 2024) examined the impact of digitization on the tax collection process and taxpayer commitment in Bechar, Algeria, highlighting improvements in tax collection and increased commitment due to digital methods. Together, these studies demonstrate the transformative effects of digital technologies on tax administration efficiency and compliance.

3. Definition to Study Variables

3.1. Digital Technologies: Digital technologies are a wide group of electronic tools, platforms, and resources which create, store, or process data in any form. Examples are software, applications, and services over the internet. Cloud computing and artificial intelligence are just two of these pieces. Generally speaking, digital technologies will automate, enhance, and accelerate various tasks and processes by

manipulating data, its real-time processing, and connecting online, therefore raising efficiency and extending capabilities in many areas.(Syrtsseva, et al., 2021, pp. 3-4).

3.2. Digital Transformation: Generally speaking, digital transformation is the change that occurs in companies and organizations in respect of their integration of digital technologies into all areas of business; this drastically changes how they operate and deliver value to customers. It needs a cultural shift; hence, organizations are continuously compelled to probe the status quo and experiment with getting comfortable with failure. The effectiveness of this transformation into digital delivery is, therefore, pegged on the development of the workforce with the right skill set (Bentley, 2020, p. 353)

It involves digital transformation in the sphere of tax management, incorporating electronic filing and automated processing of taxes and compliance with digital tools. This would permit easy facilitation of operations without sacrificing accuracy and efficiency.

3.3. The importance of digital technologies in tax management:

Digital technologies play a crucial role in tax management, significantly enhancing efficiency, service quality, and transparency. The digitalization of tax administrations has allowed tax authorities to use modern technologies such as advanced analytics, big data, and blockchain to streamline processes, reduce manual errors, and improve taxpayer experience. The transition from paper to digital forms. is a critical step toward aligning with global best practices and meeting the demands of a digital society. This transformation

not only increases operational efficiency but also enables the introduction of new services, better management of taxpayer data, and more accurate tax assessments (Pitić, Radosavljević, Babin, & Erić, 2019, p. 131).

The importance of digital technologies in tax management is highlighted in their ability to mobilize domestic revenue. For instance, the introduction of digital financial service taxes (DFSTs) has been a response to the expansion of the digital economy and the need for governments to adapt their tax systems to this new landscape. These technologies not only help in revenue collection but also promote transparency and reduce opportunities for tax evasion. Moreover, they facilitate better compliance monitoring and can improve the overall efficiency of tax administration (Mpofu & Mhlanga, 2022, p. 19).

Digital technologies play a crucial role in modern tax management by enabling more efficient revenue collection, broadening the tax base, and supporting financial inclusion. However, these benefits must be balanced against potential risks to ensure that tax policies foster rather than hinder economic development.

3.4. Digital technologies used in tax administration: There are many digital technologies adopted by fiscal administrations at the level of many countries, including (Djafri, Damawati, Suharto, Satwika, & Rahmatullah, 2023, pp. 21-22):

- Electronic Tax Systems

- E-Registration: An online system for taxpayers to electronically register, which makes it easier for them on their first time of registering for taxes.

- E-SPT: Electronic system for submission of tax returns by the taxpayers, making reporting more efficient and potent.

- **E-Filing:** Web-based real-time submission of tax returns to simplify the process of tax filing for the taxpayer.

- **E-Payment:** Online payment of taxes through different electronic channels by taxpayers, thus enabling timely and secure processing of these transactions.

- **Blockchain Technology:** Applied to digital data storage, blockchain maintains transparency and integrity of tax transactions through decentralization of control and protection of data through cryptographic methods.

- **Artificial Intelligence:** AI is used to carry out analytics on large data volumes, thus supporting the relevant authorities to detect suspicious transactions and reinforce regulatory supervision.

AI-driven chatbots serve taxpayers automatically through responses to queries and explanations of tax processes in a friendly, colloquial way.

- **Biometric Identification Technologies:** fingerprint recognition, iris scanning, and face recognition applied to the authentication process for taxpayers, enabling secure access to tax services and fraud prevention.

- **Providing Call Centers and Helpdesks:** The center allows the taxpayer to contact the tax authority, district or local office, or a helpdesk for consultations and problem resolution without having to physically come to the office.

- **Websites and Information Media:** The website www.pajak.go.id provides easy access to general information on taxation and supports compliance during the process.

3.5. SAP Information System for Applications and

Production

Navigating the complex world of business processes can be quite a challenge. SAP stands out as a frontrunner in this domain, offering robust software solutions that streamline operations. Their tools not only enhance efficiency but also

provide invaluable insights, enabling businesses to make informed decisions (SAP, 2024). The SAP system specially designed for the Algerian fraternal system contains many characteristics and features as follows (Asantcheeff, 2018):

3.5.1.The Concept of Transitioning to a Modern

Information System:

The introduction of modern information and communication technologies at the level of tax administration represents a crucial stage in the continuation of the modernization program. This requires adapting tax legislation to move towards intangible technologies and framing the electronic entry into the central system.

Indeed, in the initial phase, a foreign consulting firm was employed and utilized to assist the General Directorate of Taxes in launching this project. This was done through the preparation of a specifications document that responds to the specific needs and technical requirements associated with the professional tasks of the General Directorate of Taxes on one hand, and the preparation of the contract project on the other. Based on this approach, the administrative and technical efforts undertaken by the General Directorate of Taxes ultimately resulted in the employment of a Spanish operator (Indra-sistemas) for the purpose of acquiring and implementing a tax information system. This project consists of 23 lots, starting from the framing phase and ending with the maintenance and warranty phase.

Consequently, the information system proposed by this operator is based on an IT solution of the ERP-SAP type, composed of several integrated units that generally respond to the requirements of the professional tasks of tax

administration, with the programming of the following elements:

- Adjustment and definition of the IT solution.
- Addressing the IT developments specific to the needs of the professional tasks of the General Directorate of Taxes.

3.5.2.SAP System Technologies and Functions:

Transition from a Work Model Based on Manual Management to a Work Model Based on Analysis, Revision, and Information Control

- A unique data model, available to all structures, which will reduce manual intervention by agents and the duplication of data entry and calculations.
- Immediate and real-time access to information.
- Restricted access to information and functionalities according to the hierarchical and organizational profile of each agent/user.
- Consolidation of a centralized system that allows a 360-degree view of the taxpayer.

Table 1.Comparison of previous information systems with SAP

SAP Information System	SIREC + SGF Information System
100% of accounting entries are created manually: - Significant effort required for creating accounting entries. - Substantial effort required for control. - Risk of human error.	100% of accounting entries are created manually: - Significant effort required for creating accounting entries. - Substantial effort required for control. - Risk of human error.
Extra-accounting processing of certain operations (e.g., tax reliefs and non-value admissions).	Extra-accounting processing of certain operations (e.g., tax reliefs and non-value admissions). Accounting information repeated in various information sources. Slow and complicated information consolidation.

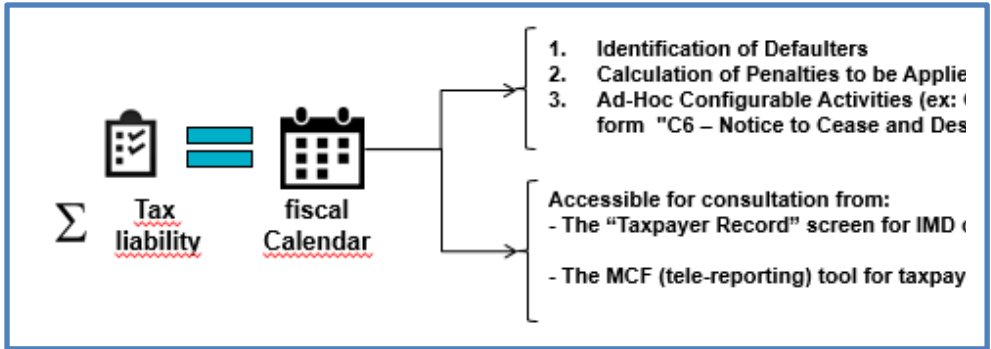
- Accounting information repeated in various information sources. - Slow and complicated information consolidation. - Possibility of human errors and accounting discrepancies.	- Accounting concordance. - Data uniqueness. - Real-time information retrieval. - No effort required for consolidation of accounting entries. - Minimization of human errors.
- Preparation and execution time for distribution takes a minimum of approximately 3 days. .	- Preparation and execution time equal to machine processing time. - No possibility of distribution errors. - Allows unlimited execution in "test" mode.
- Risks of errors.	- Specific real-time access to target information. - Capability to export to MS Excel.
- The NCT-cash system combines financial accounting and analytical accounting	- Adaptation of the NCT to good accounting practices (accrual basis) with separation between financial accounting and analytical accounting. - Complete end-to-end accounting traceability. - Optimal analytical capability.

Source : (Asantcheeff, 2018)

3.5.2.Core Business Activities: Tax Obligations, Defaulter Follow-up, and Penalty Calculation

Tax obligations (TO/Dunning) are the SAP technical object representing the taxpayer's subjection to a specific tax. The utility of TO/Dunning is to enable the identification of defaulting taxpayers and thus automate the "Follow-up" process. Moreover, its architecture allows, for each deadline or bracket, the calculation of penalties and the definition of actions to be taken.

ig1. system works



Source : (Asantcheeff, 2018)

- Potential for future developments of the "Recovery Process":
 - Absolute control over the taxpayer's declaration situation
 - Detection of defaulting taxpayers for each Tax/Period
 - Precision in penalty calculation (Assessment/Recovery)
- **Core Business Activities: Payment and Cash Management**
 - The cash transaction allows for the execution of all treasury operations (inflows and outflows) from a single point and for all payment methods accepted by the General Tax Directorate (cash, check, postal account).
 - The functionality enables comprehensive management of operations:
 - Automatic accounting of amounts at the time of payment
 - Automatic reconciliation between payment and debt instrument
 - Re-calculation and actual accounting of recovery penalties

- Automatic identification of collected amounts to be distributed by tax type and municipality
- Automatic creation of "Payment Receipt"
- Comprehensive management of Partial Payments, Cash Discrepancies, Clearances, Discounts, and their respective fees
- Automatic management of the order and priority of recovery allocation
- Real-time consultations: cash closing, balances, etc.

- Core Business Activities: Regulation and Management of Individual Tax Roll

- The use of SAP's Workflow engine has rationalized the process of generating, approving, and issuing individual tax rolls.
- The Individual Role functionality also allows for automatic accounting of amounts due at the same time the role is approved by the center chief, without any human intervention.
- The integration of the SAP platform allows the "Dunning" process to recalculate and control recovery penalties associated with the individual role.
- Automation of accounting and approval flow
- Detailed information at each stage of the process
- Traceability of the approval process. Synergy and integration with other functionalities.
- Reduction in process execution time

In addition to the basic functions described up to this point, in phase configured numerous other functionalities that ensure the proper execution of the main tasks of tax management, such as:

All these functions have been complemented with the configuration of a series of ad-hoc reports that meet the DGI's reporting needs.

In addition to ad-hoc reports, the system has an information query service with filtering that allows each user to extract specific desired information from the database.

3.5.3. Partner:

- In SAP terminology, the term Partner is equivalent to Taxpayer.
- The Taxpayer will have a unique number in SAP that will serve for internal identification in the system.
- We will call it "SAP Identifier Number" for the taxpayer or simply "Partner Number".

This number is different from the tax identification number (NIF), which is also part of the database and is associated with the partner number.

3.6. JIBAYATIC Portal

The Algerian Tax Administration is implementing a sector modernization program that plans for a comprehensive reform of the structure and working methods of its services. This tax information system is still under development and improving the relationship with institutions forms a strategic foundation.

The "Jibayatic" portal represents a new experiment in remote procedures, aimed at facilitating administrative processes and simplifying tax obligations for taxpayers by allowing them to declare and pay taxes online. The term "Jibayatic" is derived from the Arabic word "Jibaya" (taxation) and "tic" refers to Information and Communication Technology.

The "Jibayatic" portal offers online services to taxpayers affiliated with the Large Enterprises Directorate, Tax Centers, and Local Tax Centers. The use of this tax declaration format is subject to prior voluntary enrollment.

Enrollment Process: Taxpayers wishing to benefit from "Jibayatic" services can contact the reception service at the Large Enterprises Directorate, Tax Center, or Local Tax Center. They will receive a personal reception during which the new tax declaration format will be presented, including its advantages, a practical demonstration of the service, and the portal enrollment process (General Directorate of Taxation, 2024).

3.6. Advantages:

- Portal services are free, except in cases of emergency, and are characterized by high availability and ease of access.
- Data exchange between the taxpayer and the portal is conducted securely.
- The use of these services is accompanied by an assistance tool that helps avoid calculation errors and typographical errors resulting from paper procedures.
- Submission of declarations through this portal is followed by an automatic payment notification, ensuring correct receipt of the tax declaration.

4. Analysis and Discussion

In the practical aspect, we conducted a field study at the Tax Directorate of Oum El Bouaghi Wilaya, specifically at the Wilaya Tax Center. The focus of the applied study is to compare annual tax collections and uncollected amounts considered as tax evasion from the period 2014-2023. The comparison is made between the information systems used.

4.1. Fiscal revenues from 2014 – 2023: Represented in

Table 2

Table 2. Annual collections of fiscal revenues during the period 2014-2023 at the Tax Centre Oum El Bouaghi

million Algerian dinars					
Years	2014	2015	2016	2017	2018
Fiscal revenues of the information system SIREC + SGF	3233	3033	3315	3755	3051
Years	2019	2020	2021	2022	2023
Fiscal revenues of the information system SAP	3535	3683	4109	4703	6219

Source : (State Directorate of Taxation, 2024)

Table 2. At the Tax Centre of Oum El Bouaghi, an important change in fiscal revenue collection was observed after the implementation of the SAP system. Before the implementation, the revenue collection showed a stable trend, standing around the level of 3 billion Algerian dinars. From 2014 to 2017, there was a low increase that reached its peak at 3755 million dinars in 2017. In the year 2018, the collection declined, reflecting perhaps some macroeconomic effects outside the view of the information system. The turning point, however, was in the year 2019, when the introduction of SAP was introduced. This resulted in a huge hike in the revenue collection to 3535 million dinars. This healthy trend indeed

went on unabated, culminating in a steady year-on-year increase to an impressive 6219 million dinars in the year 2023. This also almost doubled the highest revenue collection seen during the period of SIREC + SGF usage and therefore underlined the impactful contribution that is provided by the SAP system.

This would, with strong force, indicate that the SAP system enhanced efficiency and effectiveness in revenue collection. This can be attributed to several factors:

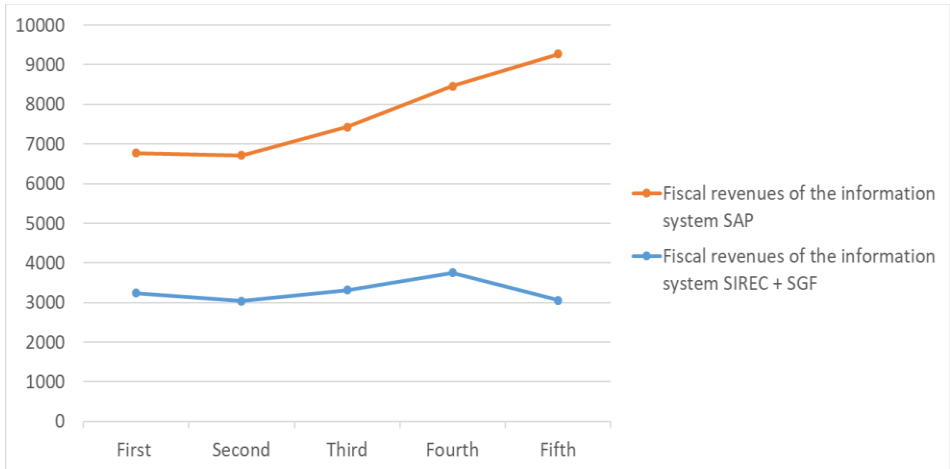
- **Improved Data Management:** SAP furnished a better and more centralized data management system required for the tracking and analysis of the flow of revenues in real time, hence enabling possibly better decision-making.

- **Enhancement in Automation:** Automation of procedures or processes, such as tax calculation, filing, and payment processing, contribute toward increased efficiency by reducing manual errors and improving speed.

- **Improved Transparency and Accountability:** The integrated nature of the SAP systems drove more accountability and hence, more transparency in the operations of the Tax Centre for better compliance of the tax collection process.

While the data strongly indicates a probable cause-and-effect relationship between the SAP implementation and increased revenue collection, any further research required must be done to ascertain what factors have changed and then quantify those factors. Nonetheless, available evidence against this hypothesis reveals a clear positive correlation between the adoption of the SAP system and improvement in fiscal revenue performance at the Tax Centre Oum El Bouaghi.

Fig 2. Comparison of SIREC + SGF and SAP information system collections from first year of application each system to fifth year



Source: Prepared by the researcher on the basis of the data provided

Fig 2. The SIREC + SGF system, while demonstrably functional, demonstrates a modest and somewhat erratic performance trajectory. Despite a slight increase in the first year, the collection figures fluctuated, ultimately culminating in a decrease by the fifth year. This indicates limitations in the system's efficiency, due to inherent system constraints or inefficiencies in data management and processing.

The introduction of the SAP system marks a significant shift in revenue collection performance. From its first year of implementation, SAP demonstrates a remarkable increase in revenue collection, far exceeding the peak performance of the SIREC + SGF system. This growth trend continues consistently throughout the five-year period, culminating in a significant leap in revenue collection by the fifth year. This highlights the transformative impact of SAP on revenue generation capabilities.

This comparative analysis strongly suggests that the SAP system offers a superior and more effective approach to revenue collection compared to the SIREC + SGF system. The consistent and dramatic growth in revenue collection under SAP highlights its transformative impact and confirms its suitability for maximizing revenue generation potential. Further investigation into the specific features and functionalities of SAP that contribute to these results would provide a deeper understanding of its effectiveness and offer valuable insights for optimizing tax administration practices.

4.2. Components of Tax Revenues for the Oum El Bouaghi

Tax Center during the period 2014-2023: Represented in Table 3.

Table 3.Components of fiscal revenues during 2014-2023 at the Tax Centre Oum El Bouaghi

	million Algerian dinars				
Years/SIREC + SGF	2014	2015	2016	2017	2018
Gross Income Tax	377,25	290,91	276,21	259,07	232,25
Corporate Profit Tax	762,43	797,10	823,27	1087	823,53
Stamp and Registration Duties	26,47	23,27	21,22	17,46	23.82
Value Added Tax	943,45	688,72	863,10	855,52	1097
Tax on Professional Activity	947,47	1064	1152	942,44	1040
Single Flat-rate Tax	0,14	0,26	3,74	1,95	0.82
Mining Profits Tax	59,74	40.54	74,20	76,97	76,02
Various	116,20	128,07	10,16	114,56	144,78

Years/SIREC + SGF	2019	2020	2021	2022	2023
Gross Income Tax	264,87	285,39	301,83	516,20	934,16
Corporate Profit Tax	841,76	809,25	793,17	863,31	873,62
Stamp and Registration Duties	25,10	24,70	30,75	41,17	83,80
Value Added Tax	875,14	1780	1317	1735	1933
Tax on Professional Activity	1118	1870	1387	2161	1907
Single Flat-rate Tax	0	0.06	0.14	1,41	15,30
Mining Profits Tax	78,14	34,74	6,44	5,38	1,91
Various	225,14	225,96	271,72	278,95	470,71

Source : (State Directorate of Taxation, 2024)

Table 3. The data gives a close insight into how the different elements constituting fiscal revenue have changed at the Tax Centre Oum El Bouaghi before and after the SAP system implementation. It brings out that the structure of revenues has dramatically changed, reflecting the contribution of the new system toward new ways of collecting taxes.

Pre-SAP, 2014-2018: In the period of the SIREC + SGF system, there was a relatively stable pattern in the sources of revenues. The Corporate Profit Tax is leading constantly, followed by the Value Added Tax and Tax on Professional Activity. Gross Income Tax and Mining Profits Tax went up and down, but the shares changed insignificantly. Even more interesting is the fact that the "Various" group also became highly volatile. This would indicate that for some sources of revenues, there is no uniform process or effective tracking of the same.

Post-SAP (2019-2023): The implementation of the SAP system largely changed the structure of revenues. Value Added Tax (VAT) became the major source of revenue at 1933 million dinars for 2023, followed by Corporate Profit Tax. This is attributed mainly to the increased efficiency gains under the SAP of VAT collection and administration, thus pointing to the system for enforcing VAT compliance. Another high percentage variation was seen in Gross Income Tax, prevailing at an increased participation between the year 2019 and 2023 with 264.87 million dinars and 934.16 million dinars, respectively. This indeed reflects improvement in the tracking and collection of personal income tax under SAP, facilitated by better data management and increased transparency.

The "Others" category, though still fluctuating, bears a bigger percentage ratio than in the previous system. Insofar as this may indicate increased diversity of sources of revenues, it also signals a further need to streamline and standardize such revenue streams.

This data serves as testimony that the SAP system seriously changed the structure of fiscal revenue in the Tax Centre Oum El Bouaghi. In fact, besides solidifying such key sources of revenue as VAT and Corporate Profit Tax, it brought an unexpected jump in the Gross Income Tax share, which is a signal of more effective collection of personal income tax. This would suggest that there is a better diversified and stronger revenue base, possibly due to the enhanced data management, automation, and transparency capabilities of the SAP system.

4.3. Uncollected Remainder During the Period 2014-2023: Represented in Table 4.

Table 4. Uncollected Remainder During the Period 2014-2023 at the Tax Centre Oum El Bouaghi

million Algerian dinars					
Years	2014	2015	2016	2017	2018
Uncollected					
Remainder of the information system	7211	10253	6522	2004	916,18
SIREC + SGF					
Years	2019	2020	2021	2022	2023
Uncollected					
Remainder of the information system	955,45	1631	2464	3972	6838
SAP					

Source : (State Directorate of Taxation, 2024)

In this context, it is noticed that **Table 4.** The SIREC + SGF system records a huge and dramatic decrease in uncollected remainder, especially after 2017, amounting to 2004 million dinars. The SAP era shows constant growth upwards, reaching the peak uncollected amount of 6838 million dinars in 2023. The analysis, in the context of increased 2023 numbers of tax file transfers due to the amendment of the Finance Law that increased the threshold turnover level, is quite valuable since this uncollected difference is part of tax evasion.

- Pre-SAP Performance: The years of the first performances, 2014-2018, were characterized by high uncollected

remainders. This means that the SIREC + SGF system faced some challenges for efficient revenue collection with drawbacks that might be inherent in the system. Whereas the uncollected remainder decreased significantly from 2016 to 2018, it indicated that the system was able to show improvement in performance over time. This should also be tempered with the fact that the uncollected remainder represented a huge amount attributed to tax evasion since the system did not possess effective mechanisms to identify such malpractices and deter perpetrators.

- Post-SAP Performance (2019-2023): The use of SAP in the first years of operations really reduced the uncollected remainder in 2019-2020, this reached 955.45 million dinars. It would thus seem that the new system, in its beginnings, favored greater effectiveness in internal revenue collection with far-reaching data analysis and detection of potential evasion practices. However, this balance increased gradually from 2021, reaching a peak in 2023.

The sharp increase in tax files transferred in 2023 to the Tax Centre Oum El Bouaghi, due to the amendment of the Finance Law, explains the reason for the upward trend in the uncollected remainder. This increased inflow of new files especially from those exceeding the 8 million Dinar threshold outpaced the centre's capacity for immediate collection and contributed to the higher uncollected remainder in 2023. Additionally, this increase was exacerbated by higher incidences of tax evasion among those newly transferred files. Those previously operating under the threshold, less accustomed to scrutiny, were now at risk of increased evasion practices.

However, it's crucial to consider that this increased uncollected remainder exacerbated by a higher incidence of tax evasion among these newly transferred files. Individuals or entities previously operating below the threshold less accustomed to

complying with tax regulations or more inclined to evade taxes given the potential for increased scrutiny.

The rising uncollected remainder despite SAP's implementation attributed to a combination of factors:

- **New File Adaptation:** The Tax Centre's staff and systems require time to adapt to the increased workload and complexity of managing new files, impacting collection efficiency.

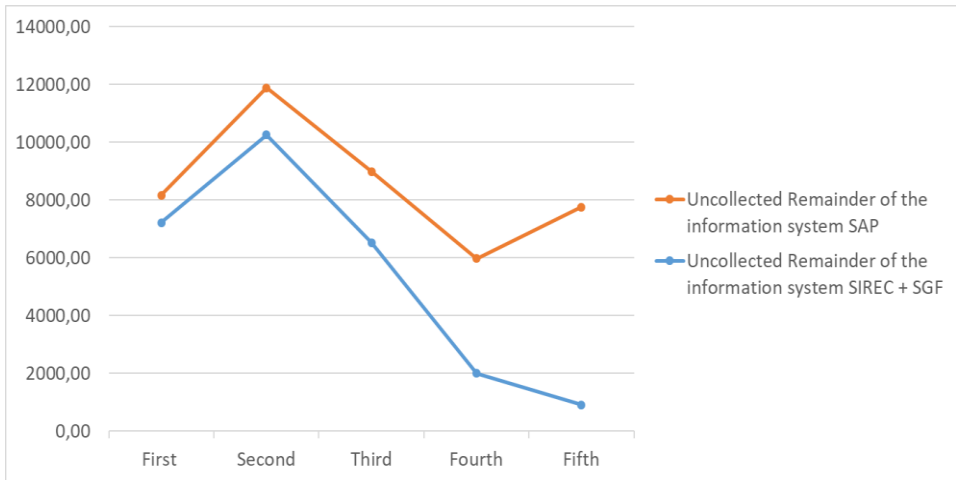
- **Collection Process Delays:** The novelty of the files and potential adjustments to the collection processes have contributed to delays in collecting these new revenues.

- **Limited Resource Allocation:** The increase in tax files have placed strain on resources, hindering the Centre's ability to fully address collection efforts.

- **Increased Tax Evasion:** The influx of new files, coupled with potential changes in tax compliance behavior among those exceeding the threshold, have contributed to a higher incidence of tax evasion, contributing to the rising uncollected remainder.

The data suggests that while SAP initially facilitated improvements in revenue collection, the significant increase in uncollected remainder in 2023 is largely influenced by the influx of new tax files due to the Finance Law amendment, exacerbated by higher rates of tax evasion. While the upward trend indicates a need for enhanced resources and operational adjustments to accommodate the increased workload, it's crucial for the tax authorities to effectively combat tax evasion within these newly transferred files. A more comprehensive analysis, taking into account the specific characteristics of the new files and the centre's capacity, is necessary to understand the true impact of SAP on revenue collection efficiency and to develop effective strategies for tackling tax evasion.

Fig 3. Comparison of SIREC + SGF and SAP information system collections from first year of application each system to fifth year



Source: Prepared by the researcher on the basis of the data provided

Fig. 3. In the first five years of the SIREC + SGF system, 2014-2018, there is seen a mixed pattern of tax collection. The uncollected residue reached a peak in 2015, showing lower collection rates, but then fell significantly in 2018, indicating either that collection mechanisms were becoming more effective or there was less tax evasion. In 2019, with the introduction of the SAP system, a different trend emerged. While the initial year, 2019, recorded a decrease in uncollected remainder compared to the last year of the SIREC + SGF system, 2018, the trend was a continuous upward trajectory in subsequent years a cause for concern. This suggests that the SAP system may not be performing well in curbing tax evasion and calls for a closer look at the factors driving this trend.

- **Initial promise of SAP:** The initial decline in the uncollected remainder in 2019 does indicate that the SAP system had a positive impact on tax collection efforts at first. However, this effect was short-lived.

- **Increasing trend of uncollected remainder:** Sustained and high levels of growth in uncollected remainder beyond 2019 raise concerns about the SAP system's ability to manage tax collection. Possible explanations include:

- **Poor Implementation of the System:** Any information system, such as SAP, requires proper implementation, integration into existing structures, and personnel training. Any shortcoming in these areas could undermine the system's effectiveness.

- **Evolving Evasion Tactics:** Tax evaders adapt their methods to circumvent new tax systems. The SAP system may not have been designed to handle these evolving tactics.

- **Increased Tax Burdens:** Changes in tax policies or regulations implemented alongside the SAP system may have increased the tax burden on businesses and individuals, leading to higher rates of evasion.

Further analysis is crucial. It is important to:

- **Evaluate SAP Implementation:** Examine the SAP system's implementation process, assess its integration with existing tax administration structures, and evaluate the training provided to tax officers.

- **Investigate Evasion Tactics:** Analyze emerging tax evasion strategies and assess whether the SAP system is adequately equipped to handle these new approaches.

Examine Tax Policies: Analyze tax policies and regulations implemented alongside the SAP system to determine whether any changes contributed to the rise in tax evasion.

4.3. Components of Uncollected Remainder During the Period 2014-2023: Represented in Table 4.

Table 5. Components of Uncollected Remainder During the Period 2014-2023 at the Tax Centre Oum El Bouaghi

million Algerian dinars					
Years/SIREC + SGF	2014	2015	2016	2017	2018
Gross Income Tax	988,93	1800	1152	36,01	102,02
Corporate Profit Tax	647,69	297,28	331,57	317,20	137,38
Value Added Tax	2950	3851	2346	848,03	405,05
Tax on Professional Activity	595,34	851,24	552,56	165,28	114,85
Single Flat-rate Tax	1,42	0,12	0,48	00	00
Stamp and Registration Duties	3,72	1,54	1,84	1,06	0,58
Indirect Taxes	1958	3394	2083	578,35	94,60
Various	63,28	56,44	53,66	58,65	61,49
Non-Fiscal Products	1,56	0,30	0,22	0,22	0,61
Years/SIREC + SGF	2019	2020	2021	2022	2023
Gross Income Tax	102,22	122,19	150,92	271,67	324,66
Corporate Profit Tax	158,70	215,62	313,03	464,97	551,00
Value Added Tax	459,66	872,76	1325	1900	3247
Tax on Professional Activity	141,10	202,99	285,81	456,21	748,73
Single Flat-rate Tax	0,90	0,84	0,64	132,18	181,81
Stamp and Registration Duties	0,60	0,79	1,41	1,81	1,95
Indirect Taxes	88,04	185,12	368,26	728,14	1769
Various	44,00	31,53	18,66	16,36	13,06
Non-Fiscal Products	0,18	0,17	0,60	0,14	0.09

Source : (State Directorate of Taxation, 2024)

Table 5. Over the span of a decade, there is a discernible trend of increased uncollected tax amounts across almost all tax components post the implementation of the SAP system. For instance, the Gross Income Tax, which stood at 102,02 million Algerian dinars in 2018, dramatically increased to 324,66 million by 2023. Such an increase to imply a significant rise in tax obligations due to economic growth and a degradation in tax collection efficiency despite technological advancements.

- **Corporate Profit Tax:** This tax showed a fluctuating yet overall increasing trend in uncollected amounts, suggesting fluctuations in corporate profits or inconsistencies in enforcement and compliance. For instance, the spike from 137,38 in 2018 to 551,00 in 2023 reflect broader economic conditions or altered corporate behaviors towards tax obligations.

- **Value Added Tax (VAT):** The sharp increase in uncollected VAT, especially notable between 2018 (405,05) and 2020 (872,76), raises concerns about the efficiency of VAT collection mechanisms even after the adoption of modernized systems like SAP. The decrease in uncollected VAT in the following years indicate partial resolutions or adaptative enforcement strategies.

- **Tax on Professional Activity and Single Flat-rate Tax:** These show considerable variability, with the Tax on Professional Activity peaking in 2023 at 748,73 from 114,85 in 2018, and the Single Flat-rate Tax drastically increasing post-2020, due to changes in the categorization and assessment of professional activities under the new system.

The SAP system's implementation, intended to enhance operational efficiency and data integrity, to have had a mixed impact. While it improved documentation and reporting capabilities, as seen in the detailed yearly data post-implementation, the actual reduction in tax evasion

(uncollected tax amounts) is not straightforward. For example, while some taxes like the Single Flat-rate Tax initially show negligible amounts, they later exhibit significant increases, which point to a lag in the system's effectiveness in enforcement or a transitional phase in tax policy adaptation. The analysis indicates that the implementation of the SAP system at the Tax Centre Oum El Bouaghi has not uniformly reduced tax evasion across all components. Although technological advancements typically aim to enhance efficiency, the data suggests that factors such as economic conditions, enforcement strategies, and taxpayer compliance behavior also significantly influence the effectiveness of such systems. The observed increases in uncollected taxes post-implementation reflect deeper systemic issues that need addressing beyond just technological upgrades. This case study highlights the complex interplay between technology, tax policy, and enforcement in combating tax evasion, suggesting that multi-faceted strategies are necessary for more effective tax collection and compliance assurance.

5. CONCLUSION

Analyzing the implementation of SAP at Tax Center Oum El Bouaghi demonstrates a radical improvement in collecting fiscal revenues: after the adoption of SAP, there has been a constant growth and increase in revenues, almost a doubling of the highest collections seen with the previous SIREC + SGF system. This further speaks to SAP's efficiency in data management and the automation of processes, adding strength to the tracking and collection of revenue. On the other hand, the same set of data conversely showed an increase in the amount not collected post-implementation, indicating the possibility of areas that may need improvement within the system to be able to deal effectively with tax evasion. These findings imply that while the implementation of SAP improved the administrative capacity at the tax center, the implications of tax evasion go beyond what such a technological implementation can effectively capture.

- Testing the Hypothesis:

- **Improved Revenue Collection:** Indeed, it has emerged that the implementation of SAP increased revenue collection markedly, as hypothesized. This turn into SAP was accompanied with a considerable increase in fiscal revenues, confirming the capacity of the system to boost efficiency in operations.

- **Tax Evasion:** While SAP proved efficient in its first post-implementation years as far as the reduction of tax evasion was concerned, over time it tended to show mixed results due to increased amounts of uncollected sums. That will imply that although SAP is installed with tools that could reduce evasion, other factors such as enforcement strategies and compliance behaviors play a critical role.

- **Comparative Performance:** The comparative performance of SAP against the old system (SIREC + SGF) supports the hypothesis that SAP outperforms in efficiency and effectiveness. Data indicate that SAP first regularized the collection of revenue and then went ahead to do so with more consistency compared to the varying performance of the old system.

- **Recommendations from the Study:**

- **Improvement in Integration and Training:** Regular training and handholding of taxation personnel will ensure the maximum utilization of SAP features and functionalities. Also, better integration of SAP with other mechanisms for enforcement can further streamline its approach to dealing with tax evasion.

- **Monitoring and Changing Tactics of Tax Evasion:** The SAP system needs periodical upgrading and modification to cope with newly developed tactics of tax evasion. Monitoring the trend through data analytics and making changes in strategy accordingly can prevent risks of more significant amounts not collected.

- **Improve Data Security and Compliance:** Given the volumes of sensitive information that come through digital systems like SAP, enhancing cybersecurity measures is critical to retaining taxpayer trust and ensuring full compliance.

- **Expanding the Use of Digital Tools:** Further investments in other complementary digital tools that may work effectively with SAP can provide a more integrated approach toward tax administration, increasing collection and compliance across wider categories of taxes.

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